

INTRODUCTION ONLY

**ROCKY FLATS ENVIRONMENTAL
TECHNOLOGY SITE
EMD OPERATING
PROCEDURES MANUAL
VOLUME II: GROUNDWATER**

**Manual No.: 5-21000-OPS-GW
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Organization: Environmental Management**

THIS IS ONE VOLUME OF A SIX VOLUME SET WHICH INCLUDES:

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VOLUME II: GROUNDWATER (GW)
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VOLUME IV: SURFACE WATER (SW)
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•95-DMR-000095	Modification and Correction of Text	2	02/16/95
GW.08	Aquifer Pumping Tests	1	05/12/92

ADMINISTRATIVE

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PER R.B. HOFFMAN, CLASSIFICATION OFFICER
JUNE 11, 1991

A-SW-001386

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TOTAL NUMBER OF PAGES: 52 (including forms)

DOCUMENT MODIFICATION REQUEST (DMR)

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Refer to 1-A01-PPG-001 for Processing Instructions.
Print or Type All Information (Except Signatures).

1. Date 2/8/95	25. DMR No. 95-DMR-000101
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2. Existing Document Number/Revision 5-21000-OPS-GW.6/Rev. 2	3. New Document Number or Document Number if it is to be changed with this Revision N/A
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8. Item	9. Page	10. Step	11. Proposed Modifications
1	7	5.2	Last Bullet: Change from "HACH portable laboratory equipment for measuring field parameters for pH, temperature, specific conductance, dissolved oxygen, total alkalinity, and nitrate." To: "Portable laboratory equipment for measuring field parameters for pH, temperature, specific conductance, and total alkalinity."
2	19	5.7	In paragraph 1, eliminate from table at beginning of paragraph: "Dissolved Oxygen (D.O.), photometric" and "Nitrate as N, photometric" and related precision and calibration requirements.
3	20	5.7	Third paragraph, Bullet 1: Remove "D.O." from first sentence. Remove fifth sentence entirely. Bullet 2: Remove "D.O." from third sentence. Bullet 4: Remove entire bullet.
4	32	5.4.8.2	Bullet 2: Delete final sentence of this bullet.

12. Justification (Reason for Modification, EJO #, TP #, etc.)

Items 1-4: The DOE has requested that the dissolved oxygen field parameter be eliminated from groundwater sampling. (reference memorandum: DOE [Schassburger] to ERM [Benedetti], 5/26/93, ref. ERD: JP 05877)

Item 2: Analysis of field nitrate is no longer required since all purge water is disposed of at the decon pad. Nitrate analysis was only required because purge water was discarded at the sampling site.

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O₂ parameter would require *in-situ* measurement only; NO₃ as N was only required by the Present Sanitary Landfill, not sitewide.

If modification is for a new procedure or a revision, list concurring disciplines in Block 13, and enter N/A in Blocks 14 and 15. If modification is for any type of change or a cancellation, organizations are listed in Block 13, then Concuror prints, and signs in Block 14, and dates in Block 15.

13. Organization	14. Print, Sign (if applicable)	15. Date (if applicable)
Group 1	Annette L. Primrose <i>N/A</i>	
OU 4	Steven R. Keith <i>N/A</i>	
OU 5,6,7	Ed C. Mast <i>N/A</i>	
IA OUs	Bruce D. Peterman <i>N/A</i>	
EOM	Marla C. Broussard <i>N/A</i>	
DM&RS	Kaye Bentzen <i>N/A</i>	
QA	R. Stephen Luker <i>4 Feb</i>	2-14-95

16. Originator's Supervisor (print/sign/date) Craig Cowdery <i>Bruce D. Peterman</i> <i>2/9/95</i>	17. Assigned SME/Phone/Pager/Location Jim Paschis/6844/080 <i>Jim Paschis</i>	18. Cost Center	19. Charge Number	20. Requested Completion Date <i>2/16/95</i>	21. Effective Date <i>2/16/95</i>
22. Accelerated Review? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	23. ORC Review				
24. Responsible Manager (print, sign, date) <i>Bruce D. Peterman</i> <i>Craig Cowdery</i> <i>2/19/95</i>					

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- Organic vapor detector (OVD)
- Gloves - latex or vinyl
- Calculator
- Containers precleaned to EPA specifications
- Coolers with sufficient blue ice to cool samples to 4_C
- Preservatives (trace metals grade)
- Disposable in-line 0.45-micrometer filters
- Logbooks and field forms
- ~~HACH~~ Portable laboratory equipment for measuring field parameters for pH, temperature, specific conductance, and ~~dissolved oxygen, total alkalinity, and nitrate.~~

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Additional equipment needed to meet the subcontractor's health and safety standards, personnel and equipment decontamination, and any specialized sampling equipment will also be required.

5.3 EQUIPMENT DECONTAMINATION AND TRANSPORTATION

Guidelines presented in SOP FO.3, General Equipment Decontamination, will be followed for decontaminating equipment involved in groundwater sampling operations. Equipment associated with the tasks involved in groundwater sampling will be decontaminated upon arrival at RFP prior to use in the field. At a minimum, all sampling equipment will also be decontaminated between

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5.7 FIELD PARAMETERS

SOP GW.5, Field Measurement of Groundwater Field Parameters, will be followed. The following field parameters will be measured during groundwater sampling:

<u>Parameter</u>	<u>Relative Precision</u>	<u>Minimum Calibration</u>
pH	.01 pH units	Daily
Conductivity	10 uS/cm	Daily
Temperature	.1 °C	Weekly
Dissolved Oxygen (D.O.)		
photometric	.1 mg/l	Each sample
Total Alkalinity	1 mg/l	Each well
unfiltered		
Nitrate as N		
photometric	.1 mg/l	Each sample
Turbidity,		
photometric (FTU)	n/a	Each well

The measuring equipment will be stored and handled in a manner that will maintain the integrity of the equipment. Specific procedures and requirements for calibration and use of measuring equipment are given in SOP GW.5, Field Measurement of Groundwater Field Parameters. Appropriate field manuals will accompany each instrument in the field. Each instrument will also be given an identification number. All logbook and field form references to individual instruments will refer to this number for ease of identification.

Field parameters will be measured at the following intervals:

- Conductivity, pH, temperature, ~~D.O.~~, and turbidity will be measured prior to well purging. This initial bail of water will be carefully removed from the well. This water will be transferred to a sample beaker by decanting the bailer through a bottom control valve. Wells purged with a pump will similarly have the first water removed, and measured for parameters. ~~D.O. will be measured first to limit the~~

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~~sample's exposure time to the atmosphere.~~ Conductivity, pH, and temperature will then be measured.

- During purging operations, conductivity, pH, and temperature will be measured after every half casing volume¹ of water is removed from the well. Wells that have half volumes less than the volume of a sample bailer will only be measured after every full casing volume of water is removed from the well. ~~D.O. and~~ Turbidity will be measured at least once during well purging at the discretion of the sampling crew.
- During purging, if a well is dewatered prior to the measurement of the final required set of parameters, then conductivity, pH, temperature, and turbidity will be measured immediately before the start of sample collection. These parameters may be delayed until sampling is completed if, at the discretion of the sampling crew, the well recharge has provided insufficient water volume to collect all the samples and also measure parameters.
- ~~The final D.O. will be measured immediately following volatile sample collection. Water remaining in the bailer after the filling of VOC vials will be transferred to a beaker using the bottom decanting valve. A determined effort will be made to limit this water from agitation and exposure to the atmosphere. If there is insufficient water in the bailer to perform this test, water decanted from the next bailer of water will be used to measure D.O. prior to any sample collection. This parameter may be delayed until sampling is completed if, at the discretion of the~~

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¹A half-volume is defined as the volume of one-half the initial well casing water volume, which will be calculated as specified in Subsection 5.6.

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~~sampling crew, the well recharge has provided insufficient water volume to collect all the samples and also measure parameters.~~

- Whenever a method used to remove well water is changed, a set of field parameters will be recorded from water removed with the new method.
- Nitrate will be measured from purge water generated at wells in the vicinity of the West Spray Field. The water tested will come from the first purge volume.
- Total alkalinity measurements will be collected only once upon completion of purging. For wells that do not dewater and sample collection proceeds to completion immediately after purging, alkalinity will be measured after the completion of all other final purge field parameters. Wells that dewater and require repeated visits for the collection of samples will have alkalinity measured subsequent to the collection of the sample for inorganic water chemistry. Alkalinity will not be measured if sufficient water is not available.

5.8 GROUNDWATER SAMPLING

Techniques used to withdraw groundwater samples from a well will be based on consideration of the parameters of interest. The order of collection, collection techniques, choice of sample containers, preservatives, and equipment are all critical to ensure that samples are not altered or contaminated. The preferred methods for collection of groundwater samples are either bailing and/or the use of bladder pumps.

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MS and MSD samples will be collected as follows:

- The well will be purged as described in Subsection 5.6 of this SOP.
- After completion of purging, VOC samples will be collected. The original sample will be collected followed by the MS and MSD. These samples will be collected in immediate succession. ~~All D.O. parameter measurements will be taken after filling the last VOC vial.~~
- The remaining parameters not requiring filtering will be collected. For each sample parameter, the original sample, MS, and MSD will be collected concurrently. The original sample bottle will be filled one-third full followed by the MS and MSD sample bottles which will also be filled one-third full. Each bottle will be rotated in the sequence, filling in one-third full until all three bottles are full. For analytes not requiring a MSD, only the original sample and the MS will be collected.
- After the original sample, MS, and MSD (where appropriate) are collected for one parameter, the process will be repeated for the next parameter.
- Parameters requiring filtering will be collected similarly. When a bailer is used, a stainless steel bucket will be filled with sample water. As samples are collected and the reservoir of water in the bucket is depleted, additional water may be added at the discretion of the sample crew. When a pump is used, the filter will be attached directly to the discharge line. Sample bottles will be filled as described above, partially filling the original sample, MS, and MSD in rotating sequence until each parameter bottle is full.

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